

Attachment L
NETWORK REQUIREMENTS

The following list of Network minimum Requirements was developed by Stakeholders and Approved by the Radio Executive Policy Committee.

All Network components must meet all local, state and federal requirements, if any.

All descriptive words included in the Requirements are used in their generic sense, and not as a trademarked, proprietary, vendor or technology specific term.

Radio System Requirements

The Network shall, at minimum, meet the following radio system Requirements:

Top Priorities
<ul style="list-style-type: none">▪ Capacity - The core network should provide sufficient capacity to 1) reliably carry the peak volume of traffic that would be required during a large-scale emergency (such as a major earth quake, the WTO demonstrations, a serious flood or eruption of Mount Rainier, the sinking of a cruise ship or the crash of two commercial airplanes) from node to node for all system components at the time the network is fully operational and for five years thereafter, including radios, systems, and talk groups; and 2) be easily upgradable to this level during the anticipated life of the network thereafter.▪ Functionality and interoperability when the Network is completed - After the transition period, Network functionality and interoperability must be higher than the highest level of functionality and availability that the current systems offer.▪ Information sharing capacity - The Network must enable the sharing of information across platforms such as CAD, radio, data terminal device, pager, telephone or any other information device commonly used in Public Safety in the Region.
Additional Requirements
<ul style="list-style-type: none">▪ Backbone components - The backbone component of the system must have a very high degree of reliability.▪ Centralized service support center - The Network must include a centralized network and service support center where network upgrades, remote diagnostics, and subscriber programming can be done quickly and easily from a central location.▪ Connectivity - The Radio System shall be capable of connecting all Dispatch, PSAP and EOC locations (and each other) with a high bandwidth connection (to be specified by Contractor). This high bandwidth connection shall facilitate the transport of voice, data, and video information as called out in these Requirements and the Contractor's work product under this contract.▪ Encryption - Systems should be assumed to provide 128-bit encryption. The core transport network must support user encrypted data and voice but is not required to do the encryption or decryption itself.▪ Functionality and interoperability during transition period - During the transition

period from the current systems to the Network, all the systems functionality, capability, and interoperability must be maintained. The transition should be planned to accomplish this even if the transition timeframe will be quite lengthy – possibly even several years.

- Improved in-building coverage – The Network shall supply improved in-building coverage without the use of external devices.
- Improved spectrum usage – The Network must be able to make more efficient use of the available spectrum than do the current systems. Typical methods include use of TDMA channels, reducing roaming through system design and management functions, or other means to be identified, so that the user has a higher degree of talk-path availability and/or the ability to add more users without negatively impacting system performance to a higher degree than is currently experienced.
- Multiband Operation – Subscriber device to communicate on 700/800 MHz frequencies as well as VHF radio frequencies to allow interoperation with other agencies must be available for use with the Network. Devices must also include those over-the-air protocols or interfaces needed to support the common area usage of subscriber devices in the Region (conventional, trunking, analog, digital, P25, etc).
- Network capability – The Network must enable all emergency response officials to share information on demand, in real time, when needed, and as authorized. These networks must be integrated and will seamlessly support users under a single “umbrella” of radio coverage incorporating all authorized frequencies.
- Network expansion – The Network must be able to add functions, features, talk groups, channels or other resources and equipment, such as operating positions, to the system.
- Network monitoring – The Network must have improved alarm integration, reporting, and statistical analysis are required. This functionality will support alarms being seen and viewed across the technical level of system operations and will allow a technician to query other parts of the system to understand impacts across the entire system. The ability to generate reports, export data, and identify trends is also a desired functionality.
- Off-the-shelf equipment – The Network shall use standardized, commercially-available off-the-shelf equipment (generic items) such as servers, microwave and transport mechanisms, and other system elements, to the extent practical in a system of this type. The ability to substitute generic items, rather than relying on proprietary parts, is considered a priority by system users and managers.
- PSAP Connectivity – The Network must include high bandwidth connectivity among PSAPS so they can exchange data and video on demand.
- Reliability – The Network should provide reliability at a factor of five nines (99.999%) from any node to any other node on the Network.
- Roaming – The Network must enable users to roam across the Region while retaining radio features. The system must operate as a single seamless radio system without regard to political boundaries, physical limitations, or other factors that do not relate to the need for emergency responders to fulfill their jobs.
- Scalable – The Network must be scalable so that ownership and maintenance

functions can be identified and segmented without degrading the seamless user experience.

- Self Healing – The Network must be able to know when there has been a full or partial component, subsystem, or site failure and to take steps to recover from such a failure. This recovery or partial recovery is often accomplished through redundancy in individual sites, some duplication of major items, such as controllers, or from overlapping coverage areas. An immediate recovery mechanism is important for consistent coverage and reliability of coverage.
- Space – The Network design should take advantage of high speed data communications to allow remote location of backup systems, a minimum of control equipment to be located on any individual site, and less site presence in general to facilitate building and maintaining the network.
- Spectrum efficiency – The system must only use channels and other resources on the basis of need, not dedication. An idle channel shouldn't tie up resources that a user may need.
- User profile – If feasible, the Network shall support the storage of the user profile in the overall system, rather than in the subscriber unit.
- Universal Coverage is the RF penetration and diversity that enables a typical subscriber device to communicate in any location that a First Responder may be summoned to in the course of expected business. This includes inside buildings of every type, in urban, suburban and rural areas, and in forest preserves, woodlands, state, county and municipal or tribal parks or land of every kind and location, National Forests and Parks lands, and any other type/owner/or nature of land area included within Pierce, Snohomish and King Counties.
- Vendor connectivity - As part of the vendor support function, the vendor must be able to connect to the Network and to remotely perform advanced diagnostics, upgrades to software and subscriber programming from a distant location.
- Vendor support – The Network vendor must have a support program that includes the ability for authorized people to obtain parts or specialized and individual guidance in overcoming a problem that may occur in the system. This service must be available on a 24/7/365 basis.

Application Requirements

The Network shall, at minimum, meet the following Application Requirements:

Top Priorities
<ul style="list-style-type: none">▪ Authorization and de-authorization of radios – Dispatchers must be able to “authorize” or “de-authorize” radios from a console operating position. The ability to authorize users without large effort, such as “roamers” in the area that are called in to support local First Responders. This may supply at least limited functionality in compatible subscriber units so that a technician will not have to “touch” a radio to grant the appropriate authorization, and the dispatcher does not need to have intimate technical knowledge to authorize the radio through traditional means. <p>This function also includes the ability to effectively “kill” a radio so that it is no longer operational until and unless a technician re-activates the radio. These functions are envisioned to allow the dispatch position to control which specific radios are allowed to participate in a talk group or to function within the system as a whole, all without specialized hardware or tools beyond that which the position is authorized.</p> <ul style="list-style-type: none">▪ Encryption - Information can be encrypted at will Region-wide using a single model. Encryption includes both Voice and Data transmissions. Systems should be assumed to provide 128-bit encryption.
Additional Requirements
<ul style="list-style-type: none">▪ Database – The Network should have an integrated radio inventory system database such that when radios are put in or taken out of service this information is also captured in the inventory system. This function would integrate the programming of radios into a central database so that current authority to operate a radio and the impact of removing or adding users is known beyond the particular system owner. This will also facilitate the cross-utilization of technical programming information across boundaries.▪ Over-the-air Reprogramming – The ability to change or modify radio operating parameters “over-the-air” anywhere a radio can operate so that radio functionality can be changed without a technician having possession of the radio. Radio operating parameters include functionality and talk-group capability as well as basic feature functions such as Emergency Alarms.▪ Over-the-air Rekeying (OTAR) – The Network must enable authorized people to send encryption keys to radios over a radio channel.▪ Over-the-air Reprogramming – The ability to change or modify radio operating parameters “over-the-air” so that radio functionality can be changed without a technician having possession of the radio. The ability to re-program “Over-the-air” (OTA) shall only be limited by radio network coverage so that anywhere a radio can

operate, it may also be reprogrammed. Radio operating parameters include functionality and talk-group capability as well as basic feature functions such as Emergency Alarms.

- Recording of transmissions – The Network must be able record all transmissions in such a way that they would be usable in court. This could be reconstructed from radio channels or on a talk-group by talk-group basis – but in any event must be considered court admissible.
- Records management systems – The Network must support, enable, and facilitate records management systems in the Region to talk to each other.
- Talk group linkage – The Network must provide the ability for Dispatchers to bring disparate groups into a single talk path. This function is intended to provide the ability for a dispatcher to merge or patch talk groups together into a single talk pathway where the communications takes place as if the users are all on a common radio channel and system.
- Key changes – Authorized people, such as dispatchers, must be able to change “keys” used in secure communications over a given radio circuit from a distant location. This functionality will facilitate the addition of selected subscriber units to a secure talk group without the need to physically “touch” the radio unit with specialized equipment.
- Prioritization – The system must be able to prioritize talk groups and individuals subscriber units so that access is governed by the priority of the individual radio, not just by talk groups. This is to insure that designated subscribers within a talk group have priorities to access the particular talk group.
- Unit ID – Dispatchers must be able to identify the source of a radio call when the field unit (subscriber unit) initiates a radio call. The unit ID should display on the radio console position as well as be available for use by a properly equipped CAD system for further use in alias processing, reporting, etc.

Subscriber Equipment Requirements

The Network's subscriber equipment shall meet, at minimum, the following Requirements:

Top Priorities
<ul style="list-style-type: none">▪ Characteristics of portable (handheld) radios – Portable radios must be easy and straightforward to operate in any situation that the first responders are expected to encounter with easy-to-understand commands. They also must be durable, emergency alert capable, encryption capable, and available for purchase as intrinsically safe. They must have Emergency Alert or alarms.
Additional Requirements
<p>The Network's portable (subscriber) equipment shall, at minimum, meet the following Requirements:</p> <ul style="list-style-type: none">▪ Battery life – A single battery must last at least the length of a 12 hour shift without replacement or an additional charge. In addition, the rating must be accurate for conditions found in public safety use, such as much longer receive times as well as somewhat reduced transmit times.▪ Cache of radios – PSAPs need a mutual cache of radios that can be shared as necessary to support an operational need. The functionality of this cache must be mutual and encompassing, such as bulk ability to re-program or re-task radios. The Network should support the ability to have a stand-by cache of radios without "automatic de-activation" or other impediment.▪ Displays – Devices shall have a display on front or top of radio as well as the options of a front facing (or back facing) display and an abbreviated top-mounted display that contains the most relevant information.▪ Hands free operation – Users must be able to operate the radio with the minimal involvement of their hands.▪ Interference – Radios must operate without harmful interference in all but the most unusual circumstances. Devices must reduce or eliminate area noise that interferes with a communication sequence (acoustic interference such as ambient noise), and RF interference from sources such as ESMR operations, and cellular telephone operations. Interference should be understood in its broadest including all forms of interference that can reasonably be encountered in Public Safety work.▪ Lapel speaker/microphones – Lapel speaker/microphones must have a retracting or coiled cord that provides a near-neutral stress between the radio and the shoulder unit and that is durable when undertaking tasks typical of a First Responder. This feature is the lightweight combination speaker and microphone used in Public Safety today.▪ Location indicator – Devices must include a method to locate the device activated whenever the user activates this feature or automatically when the emergency key is pressed. This location technology should work within buildings (i.e. firefighter down) and under all conditions that a First Responder may be involved. Dispatchers shall also have the ability to determine a radio's location by polling.▪ The ability to send information on location of the radio when the user activates the

emergency button. This parallels the user requirement for location information to be sent when an emergency alarm is activated, as well as the ability to "poll" the radio for its whereabouts.

- Multi-frequency 700/800/VHF capability. See Multiband Operation
- Radio low volume limiter – Devices must include a programmable software low volume limiter that would set the lowest volume to which a radio can be adjusted. With a minimum volume set (through feature control) the volume range of control can be restricted.
- Scan capability – Users must be able to "scan" between talk groups so that they can be aware of events in neighboring zones or patrol areas in real-time.
- Size – Radios must have a smaller package, lighter weight than current radios and should have a cellular telephone form factor, if possible. Buttons and knobs must be functional even when the user is wearing personal protective equipment (PPE).

The Network's mobile equipment shall, at minimum, meet the following Requirements:

- Hands free operation. This function is the industry accepted "VOX" operation.
- Location indicator.
- Multi-frequency 700/800/VHF capability.
- Radio low volume limiter.
- Scan capability.

Data System Requirements

Network designs must provide both fixed and wireless data services. The data Network can be integrated with the voice Network or can be parallel to it.

All data capability shall, at minimum, meet the following Requirements:

Top Priorities
<ul style="list-style-type: none">▪ Access to multiple computer systems from the field – Users shall be able to use the Network to access multiple computer systems from the field including, but not limited to, their own CAD systems. This may include functions like logging on to a neighboring jurisdiction's CAD system or roaming to other systems and maintain connectivity to the user's home CAD system.▪ The wireless data system must provide broadband coverage throughout the region for a variety of wireless mobile devices. The system must provide, at a minimum, the physical (infrastructure) and logical (data exchange) components for users to interoperate and exchange data communications directly between wireless devices, dispatch centers and across networks.
Additional Requirements
<ul style="list-style-type: none">▪ Backup voice services – The data network must be able to provide voice communication on a back-up basis so that faults in the primary voice system can be overcome through an alternate voice system. In addition, it is anticipated that many non-emergency communications sequences would take place over a broadband network.▪ Connectivity among CAD systems – The data network transport subsystem must be capable of providing an interface with the Region's CAD systems to enable sharing essential information, like caller support from the 911 system, and records research abilities. Contractor shall identify prospective transport mechanisms to achieve this, identify constraints, provide considerations for this functionality, and steps to integrate this function in current or future systems. The data network transport subsystem must interface with the Region's CAD systems to share essential information, like caller support from the 911 system, and records research abilities. We would like the Contractor to identify prospective transport mechanisms to achieve this, constraints, and considerations for this functionality, and steps to integrate this function in current or future systems.▪ Next Generation 911 - The data network must support Next Generation (NG) 911 technologies. We want to take advantage of all of the Next Generation of 911 technologies and capabilities in the Next Gen Radio System.▪ PSAP functionality – The data network must enable PSAPs to receive data coming from the public, media, or other sources, and forward it to users in the field. For example, PSAPs must be able to take data from a caller (text, video, voice) via a Next Generation E911 system and port the information to the field for view by the First Responder. The data network must also enable PSAPs to send data to and receive data from the field.▪ System reliability and availability – Data services must be reliable and available

even during major incidents. The data network must not easily overload in an emergency situation, and must include the ability to survive extended power outages, physical forces such as ice and earthquakes, and other calamities which we experience in the Region.

- Universal Coverage is the RF penetration and diversity that enables a typical subscriber device to communicate in any (reasonable) location that a First Responder may be summoned to in the course of expected business. This includes inside buildings of every type, in urban, suburban and rural areas, and in forest preserves, woodlands, state, county and municipal or tribal parks or land of every kind and location, National Forests and Parks lands, and any other type/owner/or nature of land area included within the confines of Pierce, Snohomish and King Counties. We are asking the Contractor to advise us on how we can achieve this level of coverage, and what options are available in the current or known future technologies. We are also concerned about cost and limitations involved with each option.
- Mobile computing units such as laptops and hand held devices must be able to connect to and interact with their home system's Computer Aided Dispatch (CAD) program regardless of the geographic location of the mobile unit within the system.
- Real time mapping – The data network must enable users to receive and view accurate maps, photos (including ortho-photography) and other bandwidth intensive data in the field device.
- Transmission speeds – The data network must provide Broadband Data.